



PATENT
Attorney Docket No. ASC-044C1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT(S): Fitzgerald *et al.*
SERIAL NO.: 10/611,739 GROUP NO.: 2818
FILING DATE: July 1, 2003 EXAMINER: Dung Anh Le
TITLE: METHOD OF FABRICATING CMOS INVERTER AND
INTEGRATED CIRCUITS UTILIZING STRAINED SILICON
SURFACE CHANNEL MOSFETS

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Sir:

In accordance with the provisions of 37 C.F.R. 1.97 and 1.98, Applicants hereby make of record the patents and publications listed on the accompanying Form PTO-1449, and other information contained herein, for consideration by the Examiner in connection with the examination of the above-identified patent application. In accordance with the U.S. Patent Office's partial waiver of the requirement under 37 C.F.R. 1.98(a)(2)(i), only copies of the foreign patent documents and non-patent publications are enclosed.

REMARKS

In accordance with the provisions of 37 C.F.R. 1.97, this statement is being filed (CHECK ONE):

- ☐ (1) within three (3) months of the **filing date** of a national application other than a continued prosecution application under 37 C.F.R. 1.53(d), or within three (3) months of the **date of entry of the national stage** as set forth in 37 C.F.R. 1.491 in an international application, or before the mailing of the **first Office action** on the merits, or before the mailing of a **first Office action** after the filing of a request for continued examination under 37 C.F.R. 1.114; or
- ☒ (2) after the period defined in (1) but before the mailing date of a **final action** or a **notice of allowance** under 37 C.F.R. 1.311, and

☐ the requisite Statement is below, **OR**

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- ☒ the requisite fee under 37 C.F.R. 1.17(p), namely **\$180.00**, is included herein, or
- ☐ (3) after the mailing date of a **final action** or **notice of allowance** but before the payment of the **issue fee**, **AND**
- ☐ the requisite Statement is below, **AND**
- ☐ the requisite petition fee under 37 C.F.R. 1.17(p), namely **\$180.00** is included herein.

It is respectfully requested that each of the patents and publications listed on the attached Form PTO-1449, and other information contained herein, be made of record in this application.

In addition, Applicants wish to inform the Examiner about the following co-pending patent application, including the Office actions issued therein:

- 1) 10/625,018, filed on July 23, 2003, by Fitzgerald *et al.*

Applicants believe that no additional fees are due for this paper to be entered and considered, but the Commissioner is hereby authorized to charge Deposit Account No. 20-0531 for any required fees that may be due.

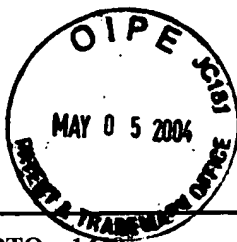
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FORM PTO - 1449 INFORMATION DISCLOSURE STATEMENT				ATTORNEY DOCKET NO.: ASC-044C1 APPLICANT(S): Fitzgerald <i>et al.</i> SERIAL NO.: 10/611,739 FILING DATE: July 1, 2003 GROUP: 2818			
U.S. PATENT DOCUMENTS							
EXAM. INIT.		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	FILING DATE IF APPROPRIATE
	A1	2001/0003364	06/14/2001	Sugawara <i>et al.</i>			
	A2	2002/0100942	08/01/2002	Fitzgerald <i>et al.</i>			
	A3	2002/0043660	04/18/2002	Yamazaki <i>et al.</i>			
	A4	2002/0096717	07/25/2002	Chu <i>et al.</i>			
	A5	2002/0123167	09/05/2002	Fitzgerald			
	A6	2002/0123183	09/05/2002	Fitzgerald			
	A7	2002/0123197	09/05/2002	Fitzgerald <i>et al.</i>			
	A8	2002/0125471	09/12/2002	Fitzgerald <i>et al.</i>			
	A9	2002/0125497	09/12/2002	Fitzgerald			
	A10	2002/0140031	10/03/2002	Rim			
	A11	2002/0168864	11/14/2002	Cheng <i>et al.</i>			
	A12	2003/0003679	01/02/2003	Doyle <i>et al.</i>			
	A13	2003/0013323	01/16/2003	Hammond <i>et al.</i>			
	A14	2003/0025131	02/06/2003	Lee <i>et al.</i>			
	A15	2003/0057439	03/27/2003	Fitzgerald			
	A16	4,010,045	03/01/1977	Ruehrwein			
	A17	4,710,788	12/01/1987	Dämbkes <i>et al.</i>			
	A18	4,990,979	02/05/1991	Otto			
	A19	4,994,866	02/01/1991	Awano			
	A20	4,997,776	03/05/1991	Haramé <i>et al.</i>			
	A21	5,013,681	05/07/1991	Godbey <i>et al.</i>			
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EXAM. INIT.		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	FILING DATE IF APPROPRIATE
	A22	5,155,571	10/13/1992	Wang <i>et al.</i>			
	A23	5,166,084	11/24/1992	Pfiester			
	A24	5,177,583	01/05/1993	Endo <i>et al.</i>			
	A25	5,202,284	04/13/1993	Kamins <i>et al.</i>			
	A26	5,207,864	05/04/1993	Bhat <i>et al.</i>			
	A27	5,208,182	05/04/1993	Narayan <i>et al.</i>			
	A28	5,212,110	05/18/1993	Pfiester <i>et al.</i>			
	A29	5,221,413	06/22/1993	Brasen <i>et al.</i>			
	A30	5,241,197	08/31/1993	Murakami <i>et al.</i>			
	A31	5,250,445	10/05/1993	Bean <i>et al.</i>			
	A32	5,285,086	02/08/1994	Fitzgerald			
	A33	5,291,439	03/01/1994	Kauffmann <i>et al.</i>			
	A34	5,298,452	03/29/1994	Meyerson			
	A35	5,310,451	05/10/1994	Tejwani <i>et al.</i>			
	A36	5,316,958	05/31/1994	Meyerson			
	A37	5,346,848	09/13/1994	Gruppen-Shemansky <i>et al.</i>			
	A38	5,374,564	12/20/1994	Bruel			
	A39	5,399,522	03/21/1995	Ohori			
	A40	5,413,679	05/09/1995	Godbey			
	A41	5,426,069	06/20/1995	Selvakumar <i>et al.</i>			
	A42	5,426,316	06/20/1995	Mohammad			
	A43	5,442,205	08/15/1995	Brasen <i>et al.</i>			
	A44	5,461,243	10/24/1995	Ek <i>et al.</i>			
	A45	5,461,250	10/24/1995	Burghartz <i>et al.</i>			
	A46	5,462,883	10/31/1995	Dennard <i>et al.</i>			
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	A47	5,476,813	12/19/1995	Naruse			
	A48	5,479,033	12/26/1995	Baca <i>et al.</i>			
	A49	5,484,664	01/16/1996	Kitahara <i>et al.</i>			
	A50	5,523,243	06/04/1996	Mohammad			
	A51	5,523,592	06/04/1996	Nakagawa <i>et al.</i>			
	A52	5,534,713	07/09/1996	Ismail <i>et al.</i>			
	A53	5,536,361	07/16/1996	Kondo <i>et al.</i>			
	A54	5,540,785	07/30/1996	Dennard <i>et al.</i>			
	A55	5,596,527	01/21/1997	Tomioka <i>et al.</i>			
	A56	5,617,351	04/01/1997	Bertin <i>et al.</i>			
	A57	5,630,905	05/20/1997	Lynch <i>et al.</i>			
	A58	5,659,187	08/19/1997	Legoues <i>et al.</i>			
	A59	5,683,934	11/04/1997	Candelaria			
	A60	5,698,869	12/16/1997	Yoshimi <i>et al.</i>			
	A61	5,714,777	02/03/1998	Ismail <i>et al.</i>			
	A62	5,728,623	03/17/1998	Mori			
	A63	5,739,567	04/14/1998	Wong			
	A64	5,759,898	06/02/1998	Ek <i>et al.</i>			
	A65	5,777,347	07/07/1998	Bartelink			
	A66	5,786,612	07/28/1998	Otani <i>et al.</i>			
	A67	5,792,679	08/11/1998	Nakato			
	A68	5,808,344	09/15/1998	Ismail <i>et al.</i>			
	A69	5,847,419	12/08/1998	Imai <i>et al.</i>			
	A70	5,877,070	03/02/1999	Goesele <i>et al.</i>			
	A71	5,891,769	04/06/1999	Liaw <i>et al.</i>			
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	A72	5,906,708	05/25/1999	Robinson <i>et al.</i>			
	A73	5,906,951	05/25/1999	Chu <i>et al.</i>			
	A74	5,912,479	06/15/1999	Mori <i>et al.</i>			
	A75	5,943,560	08/24/1999	Chang <i>et al.</i>			
	A76	5,963,817	10/05/1999	Chu <i>et al.</i>			
	A77	5,966,622	10/12/1999	Levine <i>et al.</i>			
	A78	5,998,807	12/07/1999	Lustig <i>et al.</i>			
	A79	6,013,134	01/11/2000	Chu <i>et al.</i>			
	A80	6,033,974	03/07/2000	Henley <i>et al.</i>			
	A81	6,033,995	03/07/2000	Muller			
	A82	6,058,044	05/02/2000	Sugiura <i>et al.</i>			
	A83	6,059,895	05/09/2000	Chu <i>et al.</i>			
	A84	6,074,919	06/13/2000	Gardner <i>et al.</i>			
	A85	6,096,590	08/01/2000	Chan <i>et al.</i>			
	A86	6,103,559	08/15/2000	Gardner <i>et al.</i>			
	A87	6,107,653	08/22/2000	Fitzgerald			
	A88	6,111,267	08/29/2000	Fischer <i>et al.</i>			
	A89	6,117,750	09/12/2000	Bensahel <i>et al.</i>			
	A90	6,130,453	10/10/2000	Mei <i>et al.</i>			
	A91	6,133,799	10/17/2000	Favors <i>et al.</i>			
	A92	6,140,687	10/31/2000	Shimomura <i>et al.</i>			
	A93	6,143,636	11/07/2000	Forbes <i>et al.</i>			
	A94	6,153,495	11/28/2000	Kub <i>et al.</i>			
	A95	6,154,475	11/28/2000	Soref <i>et al.</i>			
	A96	6,160,303	12/12/2000	Fattaruso			
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	A97	6,162,688	12/19/2000	Gardner <i>et al.</i>			
	A98	6,184,111	02/06/2001	Henley <i>et al.</i>			
	A99	6,191,007	02/20/2001	Matsui <i>et al.</i>			
	A100	6,191,432	02/20/2001	Sugiyama <i>et al.</i>			
	A101	6,194,722	02/27/2001	Fiorini <i>et al.</i>			
	A102	6,204,529	03/20/2001	Lung <i>et al.</i>			
	A103	6,207,977	03/27/2001	Augusto			
	A104	6,210,988	04/03/2001	Howe <i>et al.</i>			
	A105	6,218,677	04/17/2001	Broekaert			
	A106	6,232,138	05/15/2001	Fitzgerald <i>et al.</i>			
	A107	6,235,567	05/22/2001	Huang			
	A108	6,242,324	06/05/2001	Kub <i>et al.</i>			
	A109	6,249,022	06/19/2001	Lin <i>et al.</i>			
	A110	6,251,755	06/26/2001	Furukawa <i>et al.</i>			
	A111	6,261,929	07/17/2001	Gehrke <i>et al.</i>			
	A112	6,266,278	07/24/2001	Harari <i>et al.</i>			
	A113	6,271,551	08/07/2001	Schmitz <i>et al.</i>			
	A114	6,271,726	08/07/2001	Fransis <i>et al.</i>			
	A115	6,291,321	09/18/2001	Fitzgerald			
	A116	6,313,016	11/06/2001	Kibbel <i>et al.</i>			
	A117	6,316,301	11/13/2001	Kant			
	A118	6,323,108	11/27/2001	Kub <i>et al.</i>			
	A119	6,329,063	12/11/2001	Lo <i>et al.</i>			
	A120	6,335,546	01/01/2002	Tsuda <i>et al.</i>			
	A121	6,339,232	01/15/2002	Takagi			
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EXAM. INIT.		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	FILING DATE IF APPROPRIATE		
	A122	6,350,993	02/26/2002	Chu <i>et al.</i>					
	A123	6,368,733	04/09/2002	Nishinaga					
	A124	6,372,356	04/16/2002	Thornton <i>et al.</i>					
	A125	6,399,970	06/04/2002	Kubo <i>et al.</i>					
	A126	6,403,975	06/11/2002	Brunner <i>et al.</i>					
	A127	6,407,406	06/18/2002	Tezuka					
	A128	6,420,937	07/16/2002	Akatsuka <i>et al.</i>					
	A129	6,425,951	07/30/2002	Chu <i>et al.</i>					
	A130	6,429,061	08/06/2002	Rim					
	A131	6,521,041	02/18/2003	Wu <i>et al.</i>					
	A132	6,524,935	02/25/2003	Canaperi <i>et al.</i>					
	A133	6,555,839	04/29/2003	Fitzgerald					
	A134	6,573,126	06/03/2003	Cheng <i>et al.</i>					
	A135	6,583,015	06/24/2003	Fitzgerald <i>et al.</i>					
	A136	6,593,191	07/15/2003	Fitzgerald			05/16/2001		
	A137	6,602,613	08/05/2003	Fitzgerald			01/17/2001		
	A138	6,649,480	11/18/2003	Fitzgerald <i>et al.</i>			06/19/2001		
	A139	6,682,965	01/27/2004	Noguchi <i>et al.</i>			03/26/1998		
FOREIGN PATENT DOCUMENTS									
EXAM. INIT.		DOCUMENT NUMBER	DATE	COUNTRY CODE	CLASS	SUB CLASS	FILING DATE	ABSTRACT ONLY	ENGLISH LANG (Y/N)
	B1	41 01 167	07/23/1992	DE				N	Abstract only
	B2	0 514 018	11/19/1992	EP				N	Y
	B3	0 587 520	03/16/1994	EP				N	Y
	B4	0 683 522	11/22/1995	EP				N	Y
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	B5	0 828 296	03/11/1998	EP				N	Y
	B6	0 829 908	03/18/1998	EP				N	Y
	B7	0 838 858	04/29/1998	EP				N	N
	B8	1 020 900	07/19/2000	EP				N	Y
	B9	1 174 928	01/23/2002	EP				N	Y
	B10	2 701 599	03/21/1995	FR				N	Abstract only
	B11	2 342 777	04/19/2000	GB				Y	Y
	B12	4-307974	10/30/1992	JP				N	Abstract only
	B13	5-166724	07/02/1993	JP				N	Abstract only
	B14	6-177046	06/24/1994	JP				N	Abstract only
	B15	6-244112	09/02/1994	JP				Y	Y
	B16	6-252046	09/09/1994	JP				Y	Y
	B17	7-94420	04/07/1995	JP				N	Abstract only
	B18	7-106446	04/21/1995	JP				N	Abstract only
	B19	7-240372	09/12/1995	JP				N	Abstract only
	B20	10-270685	10/09/1998	JP				N	Y
	B21	11-233744	08/27/1999	JP				N	Abstract only
	B22	2000-021783	01/21/2000	JP				N	Y
	B23	2000-031491	01/28/2000	JP				N	Y
	B24	2001-319935	11/16/2001	JP				N	Y
	B25	2002-076334	03/15/2002	JP				N	Y
	B26	2002-164520	06/07/2002	JP				N	Y
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	B27	2002-289533	10/04/2002	JP				N	Y
	B28	98/59365	12/30/1998	WO				N	Y
	B29	99/53539	10/21/1999	WO				N	Y
	B30	00/48239	08/17/2000	WO				N	Y
	B31	00/54338	09/14/2000	WO				N	Y
	B32	01/022482	03/29/2001	WO				N	Y
	B33	01/54202	07/26/2001	WO				N	Y
	B34	01/93338	12/06/2001	WO				N	Y
	B35	01/99169	12/27/2001	WO				N	Y
	B36	02/13262	02/14/2002	WO				N	Y
	B37	02/15244	02/21/2002	WO				N	Y
	B38	02/27783	04/04/2002	WO				N	Y
	B39	02/47168	06/13/2002	WO				N	Y
	B40	02/071488	09/12/2002	WO				N	Y
	B41	02/071491	09/12/2002	WO				N	Y
	B42	02/071495	09/12/2002	WO				N	Y
	B43	02/082514	10/17/2002	WO				N	Y
OTHER ART, JOURNAL ARTICLES, ETC.									
EXAM. INIT.	OTHER DOCUMENTS: (Including Author, Title, Date, Relevant Pages, Place of Publication)								
	C1	Armstrong <i>et al.</i> , "Design of Si/SiGe Heterojunction Complementary Metal-Oxide-Semiconductor Transistors," <u>IEDM Technical Digest (1995 International Electron Devices Meeting)</u> , pp. 761-764.							
	C2	Armstrong, "Technology for SiGe Heterostructure-Based CMOS Devices," PhD Thesis, Massachusetts Institute of Technology, 1999, pp. 1-154.							
	C3	Augusto <i>et al.</i> , "Proposal for a New Process Flow for the Fabrication of Silicon-Based Complementary MOD-MOSFETs without Ion Implantation," <u>Thin Solid Films</u> , Vol. 294, No. 1-2 (February 15, 1997), pp. 254-258.							
	C4	Barradas <i>et al.</i> , "RBS analysis of MBE-grown SiGe/(001) Si heterostructures with thin, high Ge content SiGe channels for HMOS transistors," <u>Modern Physics Letters B</u> , Vol. 15 (2001), abstract.							
	C5	Borenstein <i>et al.</i> , "A New Ultra-Hard Etch-Stop Layer for High Precision Micromachining," Proceedings of the 1999 12th IEEE International Conference on Micro Electro Mechanical Systems (MEMS) (January 17-21, 1999), pp. 205-210.							
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OTHER ART, JOURNAL ARTICLES, ETC.		
EXAM. INIT.	OTHER DOCUMENTS: (Including Author, Title, Date, Relevant Pages, Place of Publication)	
	C6	Bouillon <i>et al.</i> , "Search for the optimal channel architecture for 0.18/0.12 μm bulk CMOS experimental study," <u>IEEE</u> (1996), pp. 21.2.1-21.2.4.
	C7	Bruel <i>et al.</i> , "@SMART CUT: A Promising New SOI Material Technology," Proceedings of the 1995 IEEE International SOI Conference (October 1995), pp. 178-179.
	C8	Bruel, "Silicon on Insulator Material Technology," <u>Electronic Letters</u> , Vol. 13, No. 14 (July 6, 1995), pp. 1201-1202.
	C9	Bufler <i>et al.</i> , "Hole transport in strained Si1-xGex alloys on Si1-yGe _y substrates," <u>Journal of Applied Physics</u> , Vol. 84, No. 10 (November 15, 1998), pp. 5597-5602.
	C10	Burghartz <i>et al.</i> , "Microwave Inductors and Capacitors in Standard Multilevel Interconnect Silicon Technology," <u>IEEE Transactions on Microwave Theory and Techniques</u> , Vol. 44, No. 1 (January 1996), pp. 100-104.
	C11	Canaperi <i>et al.</i> , "Preparation of a relaxed Si-Ge layer on an insulator in fabricating high-speed semiconductor devices with strained epitaxial films," International Business Machines Corporation, USA (2002), abstract.
	C12	Carlin <i>et al.</i> , "High Efficiency GaAs-on-Si Solar Cells with High Voc using Graded Gesi Buffers," <u>IEEE – 2000</u> (2000), pp. 1006-1011.
	C13	Chang <i>et al.</i> , "Selective Etching of SiGe/Si Heterostructures," <u>Journal of the Electrochemical Society</u> , No. 1 (January 1991), pp. 202-204.
	C14	Cheng <i>et al.</i> , "Electron Mobility Enhancement in Strained-Si n-MOSFETs Fabricated on SiGe-on-Insulator (SGOI) Substrates," <u>IEEE Electron Device Letters</u> , Vol. 22, No. 7 (July 2001), pp. 321-323.
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